

Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed August 28, 2002. No fee is due for the addition of new claims.

I. Rejection Under 35 U.S.C. §103

The Examiner has rejected claims 10-49 under 35 U.S.C. 103(a) as being unpatentable over *Fullowan* (US 5,176,792) in view of *Moslehi* (US 5,192,849).

Fullowan teaches depositing titanium, etched from the hard mask, onto the sidewalls being etched in the underlying tungsten material, in order to obtain vertical sidewalls and virtually no undercut (col. 3, lines 4-11). It is the presence of a sufficient amount of titanium etched from the mask that prevents undercutting in the tungsten layer. It would not be desirable to slow the etch rate of the mask, as a decrease in titanium can have a corresponding increase in undercutting of the tungsten (col. 3, lines 1-40). *Fullowan* therefore teaches away from "slowing the rate of erosion of the hard mask," as recited in amended claim 10. *Fullowan* takes advantage of hard mask erosion and would not obtain the same favorable results if hard mask etch were slowed.

Moslehi teaches a multipurpose RF chuck (abstract; col. 6, lines 26-68). There is no motivation to use the RF chuck of *Moslehi* with the process of *Fullowan*, as there is no teaching or suggestion in either reference that using an RF chuck would obtain the same favorable result of prevent undercutting of the tungsten layer with any likelihood of success. Further, the Examiner has stated that it would have been obvious to provide energy to the reactor using the RF chuck in order to improve the etch rate. There is no teaching or suggestion in *Moslehi*, however, that an RF chuck can be used to slow an etch rate. Therefore, even if the references were combined, there is no teaching or suggestion in either reference for "slowing the rate of erosion of the hard mask" as recited in amended claim 10. In fact, if it obvious that an RF chuck can be used to improve or increase etch rate, it would be counterintuitive to use an RF chuck to slow an etch rate. As the limitations of claim 10 are neither taught nor suggested by *Fullowan* and *Moslehi*, either alone or in combination, claim 10 cannot be rendered obvious by these references.

Claims 13, 22, 25, 26, 28, 29, 30, and 34 recite similar limitations and should not be rendered obvious. Claims 11-12, 14-21, 23-24, 27, 31-33, and 35-49 depend from these claims and also should not be rendered obvious. Applicants therefore respectfully request that the rejection with respect to claims 10-49 be withdrawn.

II. Conclusion

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned before an advisory action is issued in order to avoid any unnecessary filing of an appeal.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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By: 

Jason D. Lohr
Reg. No. 48,163

FLIESLER DUBB MEYER & LOVEJOY LLP
Four Embarcadero Center, Fourth Floor
San Francisco, California 94111-4156
Telephone: (415) 362-3800

APPENDIX

In the Claims:

10. (Twice Amended) A method for etching a pattern on a workpiece including the steps of:
- selecting a workpiece with a hard mask deposited over a layer to be etched, which hard mask is comprised of a reactive metal;
 - processing the workpiece in a reactor using an etch step and exposing the hard mask to the etch;
 - and
 - slowing the rate of erosion of the hard mask by providing energy to the reactor in order to increase a rate of oxidation of the hard mask [in order to slow down the rate of erosion of the hard mask].